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BIOLOGICAL STUDIES OF THE SMITH RIVER, VIRGINIA

Environmental Protection Agency
Philadelphia, Pennsylvania

1970

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ACKNOWLEDGEMENTS

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SUMMARY & CONCLUSIONS

A biological survey conducted on Virginia's Smith River, between September 28 and October 2, 1970 showed that aquatic life resources were adversely affected and water quality degraded by the addition of numerous industrial and municipal discharges:

1. The Smith River upstream from Philpott Reservoir supported a large and diverse population of clean water forms characteristic of good water quality.
2. The numbers and diversity of stream benthos were greatly reduced between Philpott Dam and Bassett, Virginia. Among the factors contributing to this were the scouring effect of regulated releases from Philpott dam and a stream bottom unsuitable for the development of a high density population of bottom fauna.
3. Numerous industrial and domestic discharges to the Smith River between Bassett and Martinsville resulted in degraded water quality and a bottom fauna composed primarily of pollution-tolerant species.
4. Martinsville Reservoir exhibits the high degradation commonly found in small impoundments receiving high organic waste loads and sediment. Organic Pollution from upstream sources supplied food for a bottom fauna comprised primarily of pollution tolerant forms.
5. Prior to entering North Carolina the Smith River supports a highly diverse assemblage of clean water bottom organisms indicating that the river has recovered from the effects of discharges in the Bassett-Martinsville area.

6. The substrate of the Smith River immediately downstream from the Virginia-North Carolina line was of marginal quality and was the primary factor which limited the numbers of clean water organisms.

INTRODUCTION

A biological survey of the Smith River from Virginia Route 704 Bridge to its confluence with the Dan River at Leaksville, North Carolina was conducted between September 28 and October 2, 1970 at the request of the U. S. Army, Corps of Engineers, Wilmington District. The purpose of the study was to determine the effect of releases made from the Philpott Dam and waste discharges from the Bassett-Martinsville, Virginia area on the biota of the Smith River. The biological parameters used to determine water quality were the various benthic macroinvertebrates, composed primarily of immature insect forms. These invertebrates are a recognized indicator of past and present water quality conditions.

Bottom organisms have been placed in three general categories according to the severity of water pollution which they may tolerate. Clean water associated benthos (pollution-sensitive) are characterized by individual species which may exist only within a narrow range of water quality conditions generally considered healthy. Pollution-tolerant forms are characterized by species which can live within a greater range of water quality conditions, but, which live best in aquatic environments which are polluted. The remainder of benthic organisms may be generally defined as being able to exist within a wide range of water quality conditions, the optimum environment being only vaguely defined for each species. These forms are classified as pollution-intermediates and indicate water of varying quality between clean and polluted. Of course, in reaches where pollution reaches toxic proportions, little if any benthic organisms are able to exist.

DESCRIPTION OF STUDY AREA

Smith River is an interstate stream rising out of the Blue Ridge Mountains in Southern Virginia and flowing approximately 80 miles to join the Dan River in North Carolina (map 1). The drainage area comprises approximately 540 square miles and is part of the Roanoke River Basin. Two-thirds of the watershed is forested and precipitation averages approximately 43 inches annually. In the upper reaches the stream flows through rugged terrain and is characterized by steep gradient, rocky bed and a relatively narrow flood plain. Downstream from Martinsville the flood plain broadens and stream flow is less turbulent. Stream bottom is primarily a rock-gravel composition which contains large quantities of sand and slit in the lower reaches.

Philpott Reservoir, a multi-purpose project operated by the U.S. Army Corps of Engineers is located approximately 6 miles upstream from Bassett, Virginia. This project provides flood protection and hydro-electric power generation for the area in addition to recreation benefits. The City of Martinsville also uses the river to generate hydro power at a small run-of-the-river dam and reservoir located near the south city limits. The average daily stream flow recorded at Philpott dam is about 290 cfs and at Martinsville, 470 cfs.

The Smith River is generally free from major sources of pollution until it reaches Bassett. However, in the 11 mile reach between Bassett and Martinsville there are 11 industrial and 16 municipal waste sources (Table #2).

The main stem has been designated an interstate stream and is, therefore, subject to Federal-State Water Quality Standards. Beneficial water uses within the study area to be protected by these standards include public water supply, primary and secondary contact recreation, and fish and aquatic life. A portion of the main stem upstream from Philpott Reservoir is classified as natural trout water whereas the 9 mile segment between the dam and Koehler supports a put and take trout fishery. Both reaches are stocked annually with trout by the Virginia Commission of Game and Inland Fisheries.

PREVIOUS STUDIES

Since 1961 the Virginia State Water Control Board has conducted several investigations of pollution problems in the Smith River watershed. In 1961 and 1963 the State Water Control Board made biological surveys of the Smith River from Philpott Dam to Martinsville, Virginia. The first study was prepared to evaluate the effects of untreated wastes entering the stream in the Bassett-Martinsville area. The second study was conducted as a result of citizens' complaints that industrial wastes from the area were causing taste and odor problems in the water supply of Eden (Spray), North Carolina, 20 miles downstream. In both surveys a cursory examination of the benthic fauna and flora was used to indicate water quality.

In 1969 a fish kill occurred on the Smith River below Bassett. Subsequent survey by the State Water Control Board indicated that the kill was the result of discharges from Bassett Industries, Inc. In the fall of that year Dr. John Cairns Jr. and members of the staff of Virginia Polytechnic Institute measured the level of the macro-invertebrate standing crop upstream and downstream from the discharges of E. I. Dupont de Nemours & Co. in Martinsville, Virginia.

In the spring of 1970 the State Water Control Board conducted a survey which identified sources of discharges to the Smith River and its tributaries.

METHODS

Sampling stations were selected which would correspond with areas sampled in previous surveys with additional stations included to extend the survey area upstream from Philpott Reservoir and downstream from the North Carolina State line. Each stream station was quantitatively sampled once at mid-channel using the Surber Square Foot Sampler, except those at which excessive bedrock or unsuitable substrate prevented meaningful sampling. Qualitative samples were obtained by extensive sampling of the various habitats found at each river station. Only quantitative samples were taken in the Martinsville Reservoir. Each station in the reservoir was sampled at three points on a transect across the impoundment using a Petersen Dredge.

All substrate collected was placed in large metal pails, washed, and filtered through No. 30 mesh U. S. Standard Series sieves. All material retained by the sieve was removed and preserved in a 5-10% formalin solution and returned to the Environmental Protection Agency Technical Support Laboratory, at Charlottesville, Virginia for analysis.

Classification of organisms was made following the taxonomy provided by Pennak (1953), Ward and Whipple (1963), Mason (1968), Klein (1967) Usinger (1963), Leonard and Leonard (1962), Needham and Needham (1962), and Sinclair (1964), (Table #1). Results of the quantitative samples were expressed as number of organisms per square foot of river bottom (Figure 1). Results of both qualitative and quantitative samples were expressed by the number of genera per station (Figure #2).

SURVEY RESULTS

In the headwaters of the Smith River above Philpott Reservoir good water quality was indicated by high diversity of bottom organisms and the dominance of pollution-sensitive species such as mayfly numphs and caddis fly larva, which are excellent fish foods.

Sampling in the three mile reach between Philpott Dam and Va. Highway 674 showed that the stream bottom was sparsely populated with bottom organisms. Species diversity was reduced to 9 kinds at Station 3 as compared with 26 genera upstream from the reservoir.

Since water quality in this stream reach is sufficient to support a put and take trout fishery, the paucity of bottom organisms must be due to factors other than low quality waters released from the reservoir. Although the study results are inconclusive, it appears that the poor benthic population was the result of (1) an unsuitable bottom type which, in many area was composed primarily of bed rock and large boulders and (2) the scouring effect of highly variable releases from the dam for power generation which are often 6 or 8 times greater than mean low flow.

Just upstream from Bassett, Virginia (Station #4), the benthic community had increased substantially. Bottom fauna along one bank was represented by 38 genera including pollution-sensitive mayflies, stoneflies and caddisflies (Figure 2). However, along the opposite bank, the stream bottom was covered by a rust colored precipitate and devoid of benthic fauna for several hundred feet downstream from the Bassett Mirror Co. outfall. This reduction in bottom organisms.

indicated that the effluent had a toxic effect on stream biota. One (1) river mile downstream the toxicant appeared to be dissipated and a large population of pollution-tolerant forms (over 2,000 organisms/sq. ft.) predominated, indicating an abundant organic food supply.

Downstream from Stanleytown most of the pollution-intermediate species, such as midge and crane fly larvae replaced pollution-tolerant bristleworms. The benthic population was reduced to 338 organisms per square foot and with a diversity of fourteen kinds, indicated a slight water quality improvement. However, at Fieldale (station 8 & 9) the discharge of organic wastes severly degraded the river. Five genera of pollution-tolerant bristleworms represented 95% of the benthic community (Figure #1), with a population density at station 9 of 1,981 organisms per square foot. The diversity of the benthos declines rapidly through Koehler as the river's velocity slows under the influence of Martinsville Dam and the substrate of sand and hard rock prevent development of a benthic community.

Martinsville Reservoir is a classic example of many small shallow, run-of-the-river impoundments which have filled in with sediment. The substrate of the reservoir was composed of sand, mica, organic mulch, and fine organic silts. Although industrial and domestic wastes discharged to the river upstream contribute significant organic enrichment to the impoundment, sediment build up on the bottom has a smothering effect on benthic fauna and prevents development of a large benthic population. Six genera of pollution-tolerant bristle and sludgeworms

constituted the dominant benthic life forms with a population density rangeing from 6 to 302 organisms per square foot.

The population density of the benthos immediately downstream from Martinsville Dam (Station #17) increased to 1,071 organisms per square foot indicating the impact of organic nutrients from the reservoir. Pollution-tolerant bristleworms predominated (Figure #1). However, these data also indicate that the benthic community had responded to the return of a favorable substrate with a substantial increase of diversity (Figure #2). This substrate, composed of gravel, large stones and small quantities of sand extends into North Carolina.

At station 18, 5 miles upstream from the North Carolina line, the Smith River supported a benthic fauna typical of an unpolluted stream. Here the bottom organisms numbered 550 per square foot with a diversity of 27 genera (Table #1). Furthermore, 86 percent of all organisms were pollution-sensitive stoneflies, mayflies and caddisflies which demonstrated that water quality had completely recovered from upstream pollution.

Just upstream from the Eden (Spray) Water Power and Land Co. Reservoir (station 19), North Carolina the number of bottom organisms was drastically reduced, as substrate composition changed to coarse sand. Downstream from the impoundment, at Leaksville, North Carolina the substrate returned to a favorable composition. Seven genera of pollution-sensitive organisms including mayfly numphs and caddisfly larva were present. However, a population density of 176 organisms per square foot including large numbers of pollution-intermediate midges and pollution-tolerant bristleworms indicated that the Smith River was slightly degraded before flowing into the Dan River.

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SURVEY RESULTS: BENTHIC INVERTEBRATES/SQ. FT.

Pollution-Sensitive Organisms

St.	1	2	3	4 R	5	6	7	8	9	10	11 L	11 M	11 R	12 L	12 M	12 R	13 L	13 M	13 R	14 L	14 M	14 R	15 L	15 M	15 R	16 L	16 M	16 R	17	18	19	20
Mayfly nymphs:																															
Baetis sp.	24		X	62	X	4																							20		1
Caenis sp.	2																														
Ephemerella sp.	23			3																											
Hexagenia sp.	3			4																									X	X	
Isonevhia sp.	X																														
Paraleptophlebia sp.	13			X																											
Stenonema sp.	2																														
Tricorythodes sp.	66			12																									3		1
																													1		1
Stonefly nymphs:																															
Acroneuria sp.																													X		
Peltoperla sp.				1																											
Pteronarcys sp.																													X		
Caddisfly larva:																															
Chematopsyche sp.																															11
Hydropsyche sp.	313			49	1		1		X																				447		X
Ochrotrichia sp.				1																											
Ptilostomis sp.				19																											
Rhyacophila sp.	4			1																											
Riffle Beetles																															
Elmidae				8																											
Ancyronyx sp.																													1		
Cleptelmis sp.				5																											
Cylloepus sp.				4																											
Macronychus sp.																														X	1
Microcylloepus sp.	1																														
Optioservus sp.	1			1																											
Gill Breathing Snails																															
Viviparidae				1																									X		X
Viviparus sp.																													2		
Fishfly larva																															
Chauliodes sp.																													X		
Number/Sq. Ft., Clean Water forms:	452	0	X	171	1	4	1	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	473	X	15
Number of Pollution Sensitive Genera:	12	0	1	15	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	10	3	7

Pollution Intermediate Organisms

St.	1	2	3	4 R	5	6	7	8	9	10	11 L	11 M	11 R	12 L	12 M	12 R	13 L	13 M	13 R	14 L	14 M	14 R	15 L	15 M	15 R	16 L	16 M	16 R	17	18	19	20
Scuds:																																
Hyallele azteca				2																												
Sow-Bugs:																																
Isopoda			X	1																								1				
Asellus sp.			X				X																									
Fingernail Clams:																																
Musculium sp.																																X
Snails:																																
Ferissia sp.	78			X				X				1																				
Gyraulus sp.																																
Lymnaea sp.							X																									
Dragonfly nymphs:																																
Gomphus sp.	X																															
Lanthus sp.								X																								
Crayfish:																																
Astacinae			X																										X			
Cambarinae																																
Cambarus sp.	1			1																												
Cranefly larva:																																
Antocha sp.	15			18	53	1	18	15																					X			
Eriopters sp.																															X	
Helius sp.		X																														
Tipula sp.	X			2		1			1																				1		X	
Hellgrammites:																																
Corydalus sp.				1																												
Watermites:																																
Hydracarinia			X	42	2		8																					2	1			
Leberiis sp.																																
Flatworms:																																
Turbellaria	1	X		10																								13				
Planariidae																												61				
Curtisia sp.									X																							
Snipe fly larva:																																
Rhagionidae																													1			
Blackfly larva:																																
Simuliidae				27																									2			
Horsefly larva:																																
Tabanidae				2																												
Chrysops sp.									X																							
Tabanus sp.																															X	

Pollution Intermediate Organisms

St.	1	2	3	4 R	5	6	7	8	9	10	11 L	11 M	11 R	12 L	12 M	12 R	13 L	13 M	13 R	14 L	14 M	14 R	15 L	15 M	15 R	16 L	16 M	16 R	17	18	19	20
Anthycmiids																																
Limnophora sp.		X									1																					
Dance Fly larva:																																
Epididae				10																												
Hemerodromia sp.					9		3																									X
Biting Midges:																																
Stilobezzia sp.					1				1																							
Midgefly larva:																																
Chironominae			X																									1	1		
Chironomus sp.											1																					
Cryptochironomus sp.														1																		
Polypedilus sp.												1																			X	31
Tanytarsus sp.	28			116																										7	X	2
Orthocladinae	19			27	123	3	31	73	5			5																6	5		8
Cricotopus sp.	73			147	314	55	167	302	46	X		2					1		2						1		130	21	X	46
Nanocladius sp.	5							18																								
Psectrocladius sp.					45			116																								
Spaniotoma sp.	2			124		3																										
Tanypodinae																					2	1										
Clinotanypus sp.																																
Pentaneura sp.				3																										1		

Number/Sq. Ft. of Intermediate forms:	222	X	X	533	547	63	227	524	53	X	2	9	0	1	0	0	1	0	2	0	2	1	0	0	0	0	1	0	214	40	X	87
Number of Genera of Intermediates:	11	3	5	17	8	5	7	7	6	1	2	4	0	1	0	0	1	0	1	0	1	1	0	0	0	0	1	0	7	11	6	6

Pollution Tolerant Organisms

St.	1	2	3	4 R	5	6	7	8	9	10	11 L	11 M	11 R	12 L	12 M	12 R	13 L	13 M	13 R	14 L	14 M	14 R	15 L	15 M	15 R	16 L	16 M	16 R	17	18	19	20
Mosquito larva:																																
Eucoretha sp.																														X		
Bloodworms:																																
Chironomus riparius	X							X				1								5	6						1				X	
Air Breathing Snails																																
Physa sp.					X			X	X																				X	1		
Parasitic Annelids																																
Branchiobdellidae			X					X	4									1						1						X		
Placobdella sp.																													X			
Roundworms																																
Nematoda	10			10	69	1	32	77	1			1		1						1		1					1					13
Bristle worms																																
Naididae					X				125																					6		
Nais sp.	2	X	X	877	1,562	5	61	285	655	X	6	30		7			13	29	15	2	7	1	1			1	1		36	24		2
Stylaria sp.					12		1	91	600		1	20					2	5	5	1						1			1	1		
Aulophorus sp.									195		20	27		6			4	19	16	9	1	1										
Enchytreaidae																																
Chilodrilus sp.								9																								
Enchytraeus sp.		X		11	66	33	10	135	36		6	1		1			2	5	5												
Lumbriculidae								1														2	6	1						X	32	
Lumbriculus sp.			X	2	4	13	5	225	308	X																		813		X		
Eisenella sp.		X		1			1		X																			2				
Sludgeworms																																
Limnodrilus sp.					X						123	222		43			29	75	62	63	30	63	49	2		29	33	23				14
Peloscolex sp.				7	5			6	2																					3		13
Potamothrix sp.									2																			4				
Tubifex tubifex														1			4	2	5	10	2	9	19	1		62	26	20				
Number/Sq. Ft. of Pollution Tolerant Org:	12	X	X	908	1,718	52	110	829	1,928	X	156	302	0	59	0	0	54	136	108	91	46	77	75	5	0	93	62	43	856	35	X	74
Number of Pollution Tolerant Genera:	3	3	3	6	9	4	5	11	12	2	5	7	0	6	0	0	6	7	6	7	5	6	4	4	0	4	5	2	7	6	4	6
Total Organisms/ Sq. Ft.:	686	X	X	1,612	2,266	119	338	1,353	1,981	X	158	311	0	60	0	0	55	136	110	91	48	78	75	6	0	93	63	43	1,071	548	X	176
Total Number of Genera:	26	6	9	38	18	10	14	18	19	3	7	11	0	7	0	0	7	7	7	7	6	7	4	4	0	4	6	2	15	27	12	19

X: Present in qualitative sample only
L: Left Bank M: Mid Channel R: Right Bank

FWQA
STORET SYSTEM
JAN. 23, 1973

MUNICIPAL WASTE FACILITIES INVENTORY & WASTE FACILITIES NEEDS DATA
STATE OF VIRGINIA (51)

COMMUNITY NAME AND COUNTY	BASIN YR BG YR RV	DISCHARGE TO REMARKS	POP SERVED CENSUS	FLO MGD DAILY DESIGN	TYPE TREATMENT DES.	S E W	MG/L (BOD) UNTREAT	DISCHG	NEEDS TREATMENT GRANTS
BASSETT-TOWN OF	03/02	SMITH RIVER	3100	X	NONE	- -	-	18 NONE	
05400000111	PL	----------	3058	-					
HENRY		TO CONN W/ BASSETT STAN-							
089	-	LEYTOWN PLT WHEN CONST		-					
BASSETT	03/02	SMITH RIVER	1086	X	PRIMARY	S A	156	10 47	
CAMPBELL CT ELEM SCH								A	
05400000211	53	----------	3058	.011					
HENRY		SERVES SCHOOL & SOME							
089	X	NEARBY HOMES			240				
BASSETT	03/02	SMITH RIVER	1000	.016	SECONDARY	X X	X		
J.D. BASSETT HI SCH								L E L	
0540000031	65	----------	3058	X					
HENRY		VA HEALTH DATA BOOK							
089	X				X				
BASSETT	03/02	BLACKBERRY CR TO	388	.039	SECONDARY	X X	X		
PAT. HENRY LAND CORP		SMITH R						X	
0540000041	X	----------	3058	X					
HENRY		101-VA HEALTH DATA BOOK							
089	X	218-NO CHLOR.			X				
BASSETT	03/02	BLACKBERRY CR TO	200	.020	SECONDARY	X X	X		
FAIRWAYS ACRES		SMITH R						X	
0540000051	X	----------	3058	X					
HENRY		101-VA HEALTH DATA BOOK							
089	X	218-HAS CHLOR.			X				
BASSETT	03/02	UT TO	200	.020	SECONDARY	X X	X		
STONE HOLLOW SUBD		SMITH RIVER						X	
0540000061	X	----------	50901	X					
HENRY		101-VA HEALTH DATA BOOK							
089	X	218-NO CHLOR.			X				
BASSETT	03/02	SMITH RIVER	X	X	NONE	X X	X		
BASSETT IND.-OFFICES								X	
0540000071	X	----------	3058	X					
HENRY									
089	X				X				
COLLINSVILLE	03/02	JONES CR TO	120	.012	SECONDARY	X X	X		
VA.-CAROLINA FGT LIN		SMITH RIVER						L P	
2052000021	63	----------	6015	X					
HENRY		101-VA HEALTH DATA BOOK							
089	X	218-NO CHLOR.			X				

FWQA
STORET SYSTEM
JAN. 23, 1973

MUNICIPAL WASTE FACILITIES INVENTORY & WASTE FACILITIES NEEDS DATA
STATE OF VIRGINIA (51)

COMMUNITY NAME AND COUNTY	BASIN YR BG YR RV	DISCHARGE TO REMARKS	POP SERVED CENSUS	FLO MGD DAILY DESIGN	TYPE TREATMENT DES.	S E W	MG/L (BOD) UNTREAT	MG/L (BOD) DISCHG	NEEDS TREATMENT GRANTS
COLLINSVILLE HOLIDAY INN 2052000031 HENRY 089	03/02 X X	BEAVER CR TO SMITH RIVER 101-VA HEALTH DATA BOOK 218-NO CHLOR.	200 6015	.020 X X	SECONDARY	X X	X	X X	
FIELDALE GEO W CARVER HS 31920000111 HENRY 089	03/02 49 X	GRASSY CR TO SMITH R 218-SUBSURFACE FS	1000 1337	X .016 240	SECONDARY	S X		24 10 CS FS	
FIELDALE 31920000211 HENRY 089	03/02 PL -	X	1400 1337	- - -	NONE	X -	-	18 21 NONE	
FIELDALE DOYLES TRAILER PARK 3192000031 HENRY 089	03/02 X X	UT TO GRASSY TO SMITH RIVER 101-VA HEALTH DATA BOOK 218-HAS CHLOR.	105 1337	.010 X X	SECONDARY	X X	X	X X	
FIELDALE GREENBRIER SUBD 3192000041 HENRY 089	03/02 71 X	GRASSY CR TO SMITH RIVER 101-VA HEALTH DATA BOOK 218-HAS CHLOR.	320 1337	.032 X X	SECONDARY	X X	X	X X	
FIELDALE CARVER ESTATES SUBD 3192000051 HENRY 089	03/02 71 X	GRASSY CR TO SMITH RIVER VA HEALTH DATA BOOK HAS CHLOR.	620 1337	.062 X X	TERTIARY	X X	X	X X	
FIELDALE BEECHWOOD UTILITIES 3192000061 HENRY 089	03/02 71 X	UT TO RANGELY CR VA HEALTH DATA BOOK	360 1337	.036 X X	SECONDARY	X X	X	L L P	
HENRY CO. PSA COLLINSVILLE PLANT 4193000011 HENRY 089	03/02 67 -	DANIELS CR TO SMITH RIVER SERVES PARTS OF HENRY CO	5000 6015	.400 1.000 240	SECONDARY	S	227	28 00 SCM /CM/ FTH PCG DFHR BO 209.	

FRQA
STORET SYSTEM
JAN. 23, 1973

MUNICIPAL WASTE FACILITIES INVENTORY & WASTE FACILITIES NEEDS DATA
STATE OF VIRGINIA (51)

COMMUNITY NAME AND COUNTY	BASIN YR BG YR RV	DISCHARGE TO REMARKS	POP SERVED CENSUS	FLO MGD DAILY DESIGN	TYPE TREATMENT DES. BOD	S E A	MG/L (BOD) UNTREAT	MG/L (BOD) DISCHG	NEEDS TREATMENT GRANTS
HENRY CO PSA-BASSETT -STANLEYTOWN STP	03/02	SMITH RIVER	32500	-	NONE	X	-	-	37 21 22 24 -
41930000211	PL	----------	3500	X					
HENRY		118-TO SERVE BASSETT-							259.
089	-	STANLEYTWN-FIELDALE			-				
HENRY COUNTY LAUREL PARK SUBD	03/02	LEATHERWOOD CREEK TO SMITH RIVER	1040	.104	SECONDARY	S	X	X	00 LO PCG
4195000011	65	----------	50901	X					
HENRY		102-ON RT 58 EAST OF							
089	-	MARTINSVILLE			240				
HENRY COUNTY MT OLIVET ELEM SCH	03/02	UT TO LEATHERWOOD CR	600	X	TERTIARY	X	X	48	00 LO LO ECH
4195000021	X	----------	50901	.006					
HENRY		103-NEAR MARTINSVILLE							
089	X	ON RT 777			240				
HENRY COUNTY E.I. DUPONT COMPANY	03/02	SMITH RIVER	1500	X	PRIMARY	X	X	X	47 X
41950000311	51	----------	50901	X					
HENRY		218-HAS CHLORINATION							
089	X				X				
HENRY COUNTY PLASTERS TRAILER PK	03/02	UT TO HORSEPASTURE CR TO SMITH RIVER	135	.013	SECONDARY	X	X	X	X
4195000041	X	----------	50901	X					
HENRY		101-VA HEALTH DATA BOOK							
089	X	218-NO CHLOR.			X				
HENRY COUNTY PETERS TRAILER PARK	03/02	UT TO SMITH RIVER	198	.020	SECONDARY	X	X	X	X
4195000051	X	----------	50901	X					
HENRY		101-VA HEALTH DATA BOOK							
089	X	218-NO CHLOR.			X				
HENRY COUNTY M. BROOKS TRAILER PK	03/02	UT TO SMITH RIVER	105	.010	SECONDARY	X	X	X	X
4195000061	X	----------	50901	X					
HENRY		101-VA HEALTH DATA BOOK							
089	X	218-NO CHLOR			X				
HENRY COUNTY PENDLETON TRAILER PK	03/02	TANYARD BR TO MEADOW CR	105	.010	SECONDARY	X	X	X	X
4195000071	X	----------	50901	X					
HENRY		101-VA HEALTH DATA BOOK							
089	X	218-NO CHLOR.			X				

FAQA
STORET SYSTEM
JAN. 23, 1973

MUNICIPAL WASTE FACILITIES INVENTORY & WASTE FACILITIES NEEDS DATA
STATE OF VIRGINIA (51)

COMMUNITY NAME AND COUNTY	BASIN YR BG / YR RV	DISCHARGE TO / REMARKS	POP SERVED CENSUS	FLO MGD DAILY DESIGN	TYPE TREATMENT DES. BOD	S E W	MG/L (BOD) UNTREAT	MG/L (BOD) DISCHG	NEEDS TREATMENT GRANTS
HENRY COUNTY CAMP BRANCH HILLS 4195000081 HENRY 089	03/02 71 X	CAMP BR TO LEATHERWOOD CR TO SMITH R ---------- VA HEALTH DATA BOOK	200 50901	.020 X X	SECONDARY	X X	X	X	L P
HENRY COUNTY PIEDMONT ESTATES 4195000091 HENRY 089	03/02 X X	MILL CR TO LEATHERWOOD CR TO SMITH R ---------- 101-VA HEALTH DATA BOOK 218-HAS CHLOR.	480 50901	.048 X X	SECONDARY	X X	X	X	X
HENRY COUNTY EASTWOOD SUBDIVISION 4195000101 HENRY 089	03/02 X X	UT TO LEATHERWOOD CR TO SMITH R ---------- 101-VA HEALTH DATA BOOK 218-HAS CHLOR.	520 50901	.052 X X	SECONDARY	X X	X	X	X
HENRY COUNTY WRIGHTS APARTMENTS 4195000111 HENRY 089	03/02 X X	UT WO SMITH RIVER ---------- 101-VA HEALTH DATA BOOK 218-NO CHLOR.	200 50901	.020 X X	SECONDARY	X X	X	X	X
HENRY COUNTY TOWN HOUSE MOTEL 4195000121 HENRY 089	03/02 X X	UT TO SMITH RIVER ---------- 101-VA HEALTH DATA BOOK 218-NO CHLOR.	120 50901	.007 X X	SECONDARY	X X	X	X	X
HENRY COUNTY MOOSE LODGE 4195000131 HENRY 089	03/02 X X	UT TO SMITH R ---------- 101-VA HEALTH DATA BOOK 218-NO CHLOR.	4 50901	.001 X X	SECONDARY	X X	X	X	X
LEATHERWOOD LEATHERWOOD ELEM SCH 50480000111 HENRY 089	03/02 62 X	TRIB TO LEATHERWOOD CR ---------- X 218-ROTARY FS	550 240	X .006	SECONDARY	- X	24 10	C CS FS	
RIDGEWAY DREWRY MASON HS 76560000111 HENRY 089	03/02 51 X	UT TO MARROWBONE CR TO SMITH RIVER ---------- 218-ROTARY FS	1000 624 240	X .016	SECONDARY	S X	24 10	C CS FS	

FAQA
STORET SYSTEM
JAN. 23, 1973

MUNICIPAL WASTE FACILITIES INVENTORY & WASTE FACILITIES NEEDS DATA
STATE OF VIRGINIA
(51)

COMMUNITY NAME AND COUNTY	BASIN YR BG YR RV	DISCHARGE TO / REMARKS	POP SERVED CENSUS	FLO MGD DAILY DESIGN	TYPE TREATMENT DES. BOD	S E W	MG/L (BOD) UNTREAT	MG/L (BOD) DISCHG	NEEDS TREATMENT GRANTS
RIDGEWAY RIDGEWAY ELEM SCHOOL 76560000211 HENRY 089	03/02 63 X	UT TO MARROWBONE CR ---------- 218-ROTARY FS	660 624 240	X .007	SECONDARY	S X		24 10 CS FS	
RIDGEWAY GRAVELY FURNITURE CO 7656000031 HENRY 089	03/02 71 X	REDS CR. TO SMITH RIVER ---------- VA HEALTH DATA BOOK	400 624 X	.040 X	SECONDARY	X X	X		AEM P
RIDGEWAY BROOKS TRAILER PARK 7656000041 HENRY 089	03/02 X X	UT TO MARROWBONE CR TO SMITH RIVER ---------- 101-VA HEALTH DATA BOOK 218-NO CHLOR.	150 624 X	.015 X	SECONDARY	X X	X		X
RIDGEWAY HYLTONS TRAILER PARK 7656000051 HENRY 089	03/02 X X	2 UT S TO MARROWBONE CR TO SMITH RIVER ---------- 101-VA HEALTH DATA BOOK 218-NO CHLOR.	120 624 X	.012 X	SECONDARY	X X	X		X
RIDGEWAY TRAVEL LODGE MOTEL 7656000071 HENRY 089	03/02 X X	UT TO SMITH RIVER MARROWBONE CR TO SMITH R ---------- 101-VA HEALTH DATA BOOK 218-NO CHLOR.	100 624 X	.010 X	SECONDARY	X X	X		A
STANLEYTOWN 85260000111 HENRY 089	03/02 PL	SMITH RIVER ---------- WILL CONNECT TO BASSETT STANTLEYTOWN PLANT	X 1208 X		NONE	- X	X	18 NONE	
STANLEYTOWN STANLEY FURNITURE 1 85260000211 HENRY 089	03/02 X X	SMITH RIVER ---------- 303-STP TO BE ABANDONED 103-OFFICE BUILDING	500 1208 X	.050 X	SECONDARY	X X	X	18 AEA P	
STANLEYTOWN STANLEY FURNITURE 2 85260000311 HENRY 089	03/02 X X	SMITH RIVER ---------- 103-FACTORY STP	150 1208 X	.015 X	SECONDARY	X X	X	10 .1 AEM	

FWQA
STORET SYSTEM
JAN. 23, 1973

MUNICIPAL WASTE FACILITIES INVENTORY & WASTE FACILITIES NEEDS DATA
STATE OF VIRGINIA (51)

COMMUNITY NAME AND COUNTY	BASIN YR BG YR RV	DISCHARGE TO REMARKS	POP SERVED CENSUS	FLO MGD DAILY DESIGN	TYPE TREATMENT DES. BOD	S E A	MG/L (BOD) UNTREAT	MG/L (BOD) DISCHG	NEEDS TREATMENT GRANTS
VILLA HEIGHTS STP 1	03/02	BEAVER CREEK TO SMITH R	240	.011	PRIMARY	S	A	A	18 CS
93380000111	X	----------	1000	.024					(2 SEPTIC TANKS)
HENRY 089	-	PRESENTLY CONNECTING TO MARTINSVILLE SYSTEM			240				
VILLA HEIGHTS STP 2	03/02	JONES CREEK TO SMITH RIVER	480	.023	PRIMARY	S	A	A	18 CS
93380000211	X	----------	1000	.048					
HENRY 089	-	IN PROCESS OF CONN TO MARTINSVILLE SYSTEM			240				
COMMON. OF VIRGINIA FIELD UNIT 28	03/02	UT TO JENNINGS CR TO HORSEPASTURE CR TO MAYO	100	.010	SECONDARY	A	X	A	10 CS FS
99995001811	61	---------- X		.005					
HENRY 089	X	103-CORRECTIONAL UNIT 218-ROTARY FS			X				
COMMON. OF VIRGINIA CONVICT ROAD CAMP 32	03/02	SMITH RIVER	95	.010	SECONDARY	A	X	A	X
9999500191	X	---------- X		X					
HENRY 089	X	NO CHLORINATION			X				
COMMON. OF VIRGINIA PAT. HENRY COMM.COLL	03/02	BEAVER CR TO SMITH RIVER	2500	.250	SECONDARY	A	X	A	L P
9999500581	72	---------- X		X					
HENRY 089	X	101-VA HEALTH DATA BOOK 218-HAS CHLOR.			X				

C= 56

FACILITIES	NO.	POP SERVED	MGD	MG/L IN	MG/L OUT
BEING SERVED	0	0	.000	0	0
NONE	5✓	37,000	.000	0	0
MINOR	0	0	.000	0	0
PRIMARY	7✓	4,906	.048	1,303	1,069
INTERMED.	0	0	.000	0	0
SECONDARY	42✓	38,405	6.624	4,294	831
TERTIARY	2✓	1,220	.062	0	48
TOTAL	56	81,531	6.736	3,597	1,948

RETRIEVAL DATE
JANUARY 24, 1973

IMPLEMENTATION PLANS

INDUSTRIAL WASTE TREATMENT NEEDS

STATE OF VIRGINIA (51)

4. PAGE 1

IND. / REGION	7. RECEIVING WATERS OR SYSTEM	6. COUNTY / COUNTY NAME	9. ADF/MGD	REFUSE ACT PERMIT NO.	12. MOD ENF JUST. SERVED BY INTER/INTRA EAN
5. INDUSTRY NAME / LOCATION	8. TYPE OF WASTE / STANDARD INDUSTRIAL CODES	13. REMARKS - 1 / REMARKS - 2	10. POLLUTION FACILITY TYPE	11. IMPLEMENTATION PLANS FED. APPROV MO. YR. S / STATE MO. YR. S	
6. CITY (MAJ/MIN/SUB) / COMMUNITY NAME	1. MAJOR/MINOR BASIN		REM.	3. REVIEW DATE	

08901 3 BASSETT INDUSTRIES (mirrors) 05400 (0302) BASSETT	SMITH RIVER	089 HENRY	A 702	A. A. B. B. C. C. D. D.	M. E. 0 J. S. 1 I. 1	
	2511	REG 2-TO CONN TO BASSETT STANLEYTOWN STP		9/12/72	EAN ( )	
	0302 ROANOKE RIVER					
08903 3 STANLEY FURNITURE CO DIV OF MEAD CORP STANLEYTOWN 24168 31920 (0302) FIELDALE	SMITH RIVER	089 HENRY	1.648 702	A. A. B. B. C. C. D. D.	M. E. 0 J. S. I. 1	
	2211	REG 2-WILL CONN TO STANLEYTOWN STP		9/12/72	EAN ( )	
	0302 ROANOKE RIVER					
08902 3 STANLEY FURNITURE BASSETT FURNITURE BOX 626 BASSETT 24055 85260 (0302) STANLEYTOWN	SMITH RIVER	089 HENRY	.000 702	A. A. B. B. C. C. D. D.	M. E. 0 J. S. 1 I. 1	
	2511	REG 2-TO CONN TO BASSETT STANLEYTOWN STP		9/12/72	EAN ( )	
	0302 ROANOKE RIVER					

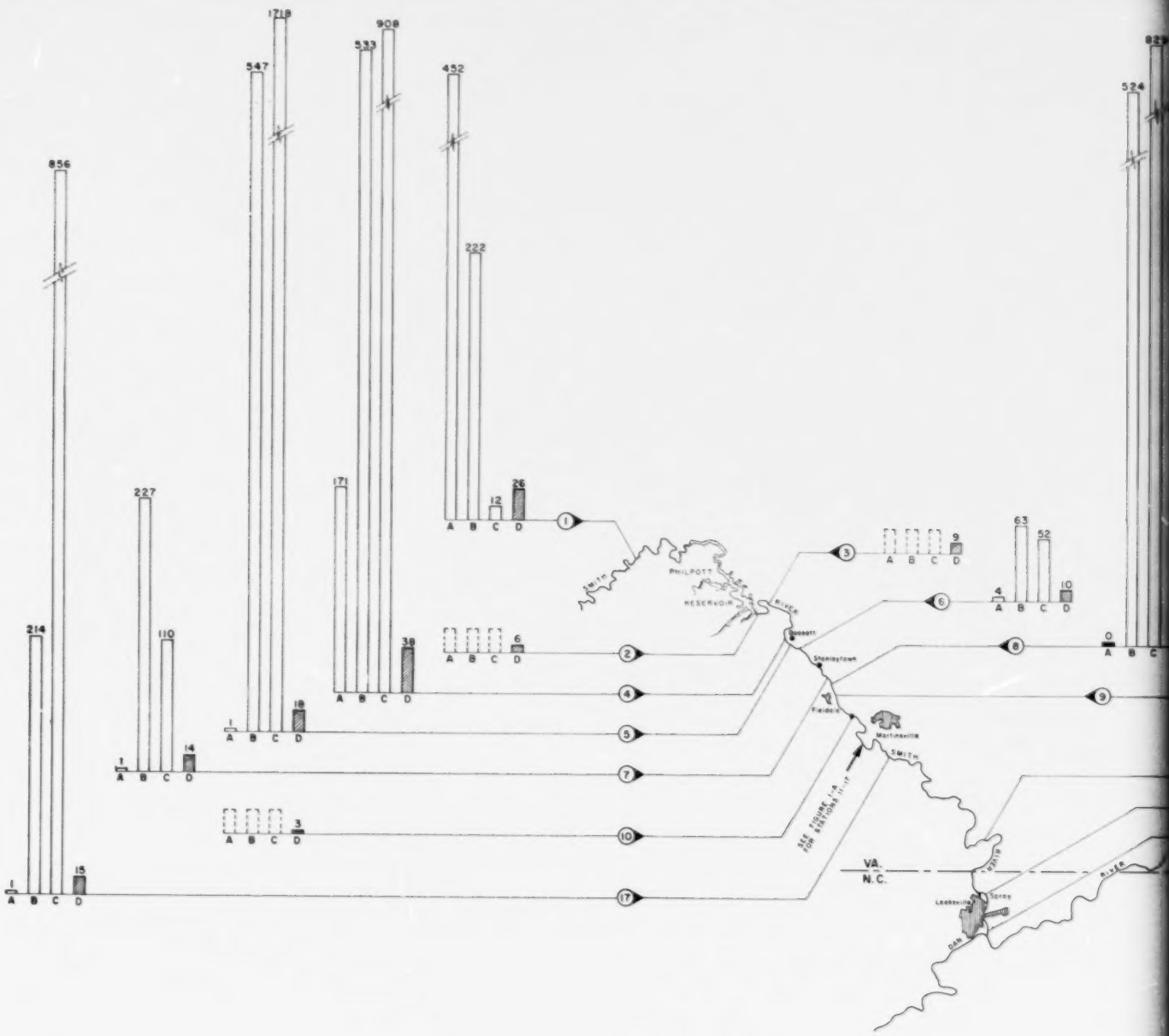
RETRIEVAL DATE
JANUARY 24, 1973

IMPLEMENTATION PLANS

INDUSTRIAL WASTE TREATMENT NEEDS
STATE OF NORTH CAROLINA (37)

4. PAGE 1

IND. REGION	7. RECEIVING WATERS OR SYSTEM	6. COUNTY COUNTY NAME	9. ADF/MGD	REFUSE ACT PERMIT NO.	12. MOD ENF JUST.
5. INDUSTRY NAME LOCATION	8. TYPE OF WASTE STANDARD INDUSTRIAL CODES	13. REMARKS - 1 REMARKS - 2	10. POLLUTION FACILITY TYPE REQ.	11. IMPLEMENTATION PLANS FED. APPROV MO. YR. S / STATE MO. YR. S	SERVED BY INTER/INTRA
6. CITY (MAJ/MIN/SUB) COMMUNITY NAME	1. MAJOR/MINOR BASIN			3. REVIEW DATE	EAN
00064 2 DUKE POWER CO	DAN R (D)	157 ROCKINGHAM	000	M. E. 0 A. A. J. B. B. S. C. C. I. 1 D. D.	
22770 (0302C3) EDEN	0302 ROANOKE RIVER	1397 0673		3/12/71	EAN ( )
00065 2 DUKE POWER CO	DAN R (D)	157 ROCKINGHAM	.002 000	M. E. 0 A. A. J. B. B. S. C. C. I. 1 D. D.	
22770 (030203) EDEN	0302 ROANOKE RIVER	1495 1273 00.003		3/12/71	EAN ( )
00066 2 FIELDCREST MILLS INC	DAN R D)	157 ROCKINGHAM	.330 840	074-UYP-2-000219 M. E. 0 A. A. J. B. B. S. C. C. I. 1 D. D.	
22770 (030203) EDEN	2231 0302 ROANOKE RIVER	0861 1270 0.500		7/12/72	EAN ( )
00191 2 DEREWAL CHEMICAL CO	UT TO TROBLSOM CR TO HAW DIR TO CAPE FEAR R	157 ROCKINGHAM	.003 812	M. E. 0 A. A. J. B. B. S. C. C. I. 0 D. D.	
64320 (0306) REIDSVILLE	2819 0306 CAPE FEAR RIVER			7/14/72	EAN ( )
00192 2 ZARN INC	UT TO LICK FORK CR TO (D)HOGANS CR TO DAN R	157 ROCKINGHAM	000	M. E. 0 A. A. J. B. B. S. C. C. I. 0 D. D.	
64320 (030203) REIDSVILLE	0302 ROANOKE RIVER	1646 0674 00.009		3/12/71	EAN ( )

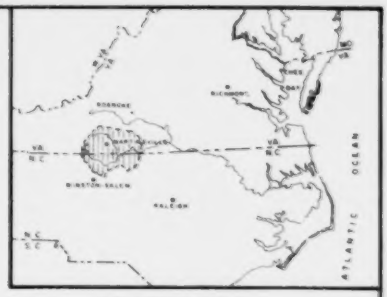


LEGEND:

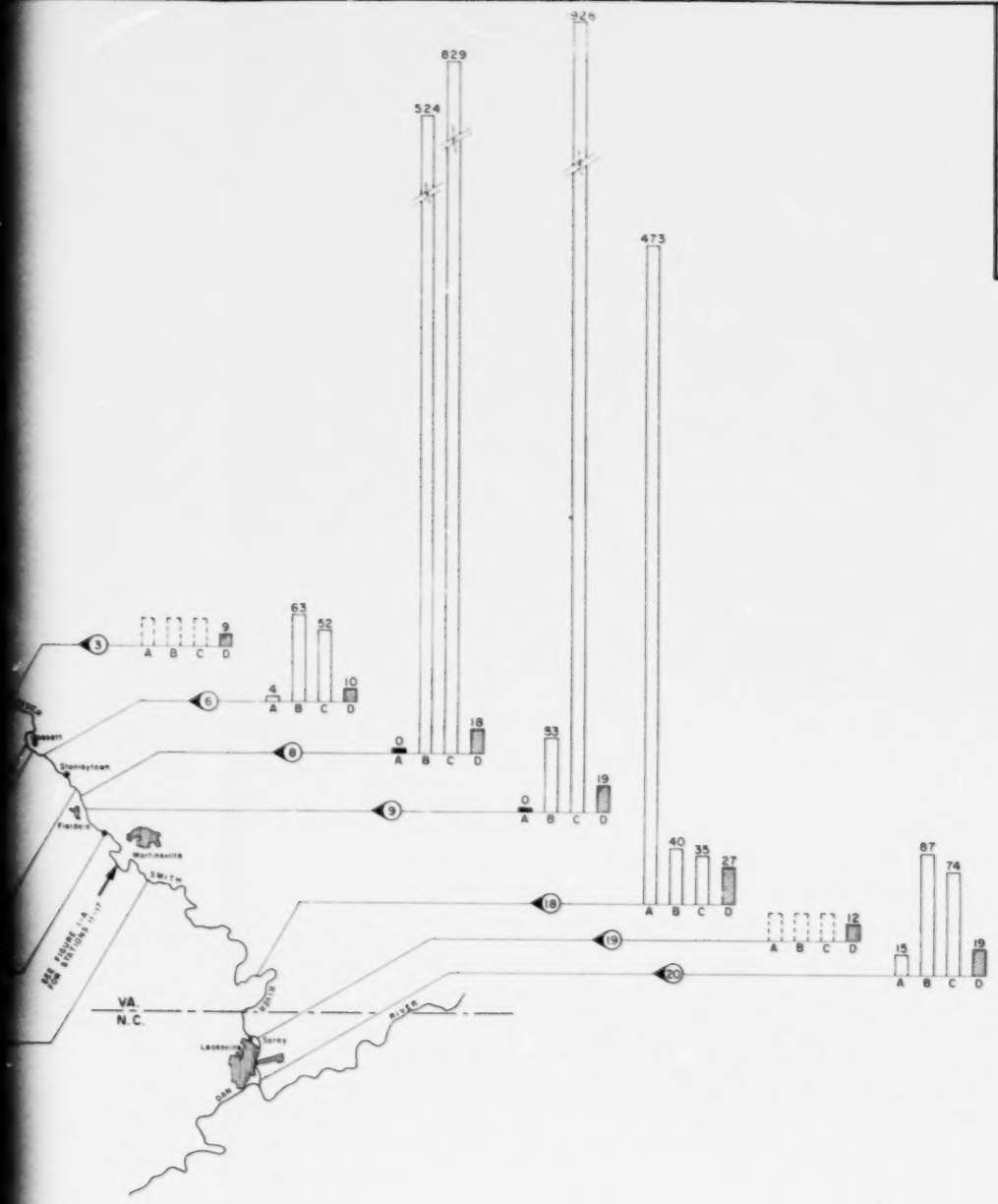
(8)	STATION NUMBER
25 / A, B, or C	QUANTITATIVE SAMPLE TAKEN AND NO. OF ORGANISMS FOUND PER SQ FT
A, B, or C	QUANTITATIVE SAMPLE NOT TAKEN
30 / 0	QUALITATIVE SAMPLE TAKEN AND No. OF KINDS (GENERA) OF ORGANISMS FOUND

BOTTOM ORGANISMS:

A	CLEAN WATER ORGANISMS FOUND IN SQ FT SAMPLE
B	INTERMEDIATE ORGANISMS FOUND IN SQ FT SAMPLE
C	POLLUTION TOLERANT ORGANISMS IN SQ FT SAMPLE
D	TOTAL No. OF KINDS, INCLUDING A, B, & C



LOCATION MAP



SCALE IN MILES

BOTTOM ORGANISMS:

A CLEAN WATER ORGANISMS FOUND IN SQ. FT. SAMPLE

B INTERMEDIATE ORGANISMS FOUND IN SQ. FT. SAMPLE

C POLLUTION TOLERANT ORGANISMS FOUND IN SQ. FT. SAMPLE

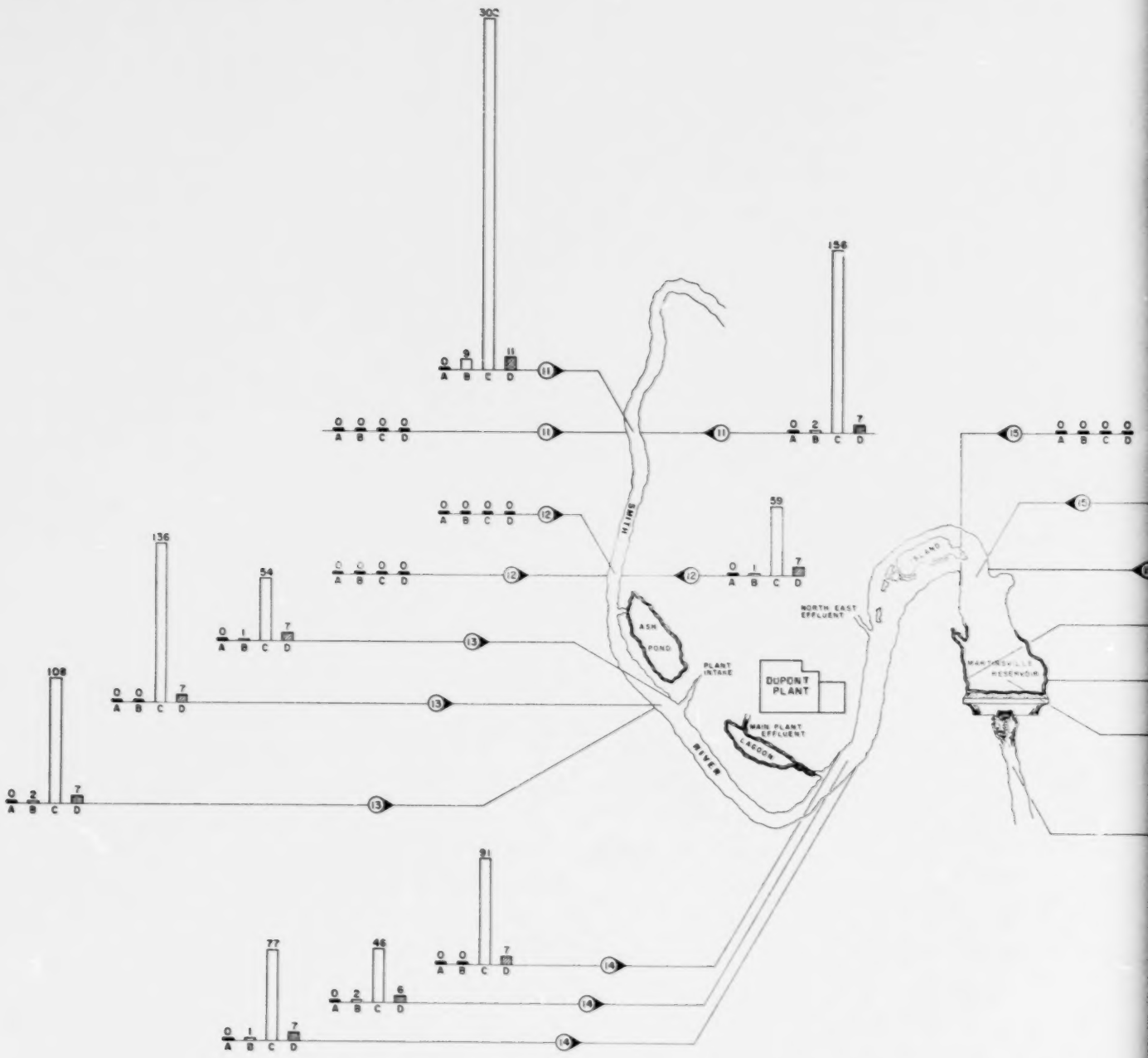
D TOTAL No. OF KINDS, INCLUDING TYPES A, B, & C

ROANOKE RIVER BASIN
MIDDLE ATLANTIC DRAINAGE AREA
BIOLOGICAL SURVEY
SMITH RIVER, VA. - N. C.

ENVIRONMENTAL PROTECTION AGENCY
REGION III PHILADELPHIA, PA.

FIGURE 1

A



LEGEND

(9) STATION NUMBER

25 — A, B, or C — QUANTITATIVE SAMPLE TAKEN AND NO. OF ORGANISMS FOUND PER SQ. FT.

A, B, or C — QUANTITATIVE SAMPLE NOT TAKEN

30 — D — QUALITATIVE SAMPLE TAKEN AND No. OF KINDS (GENERA) OF ORGANISMS FOUND

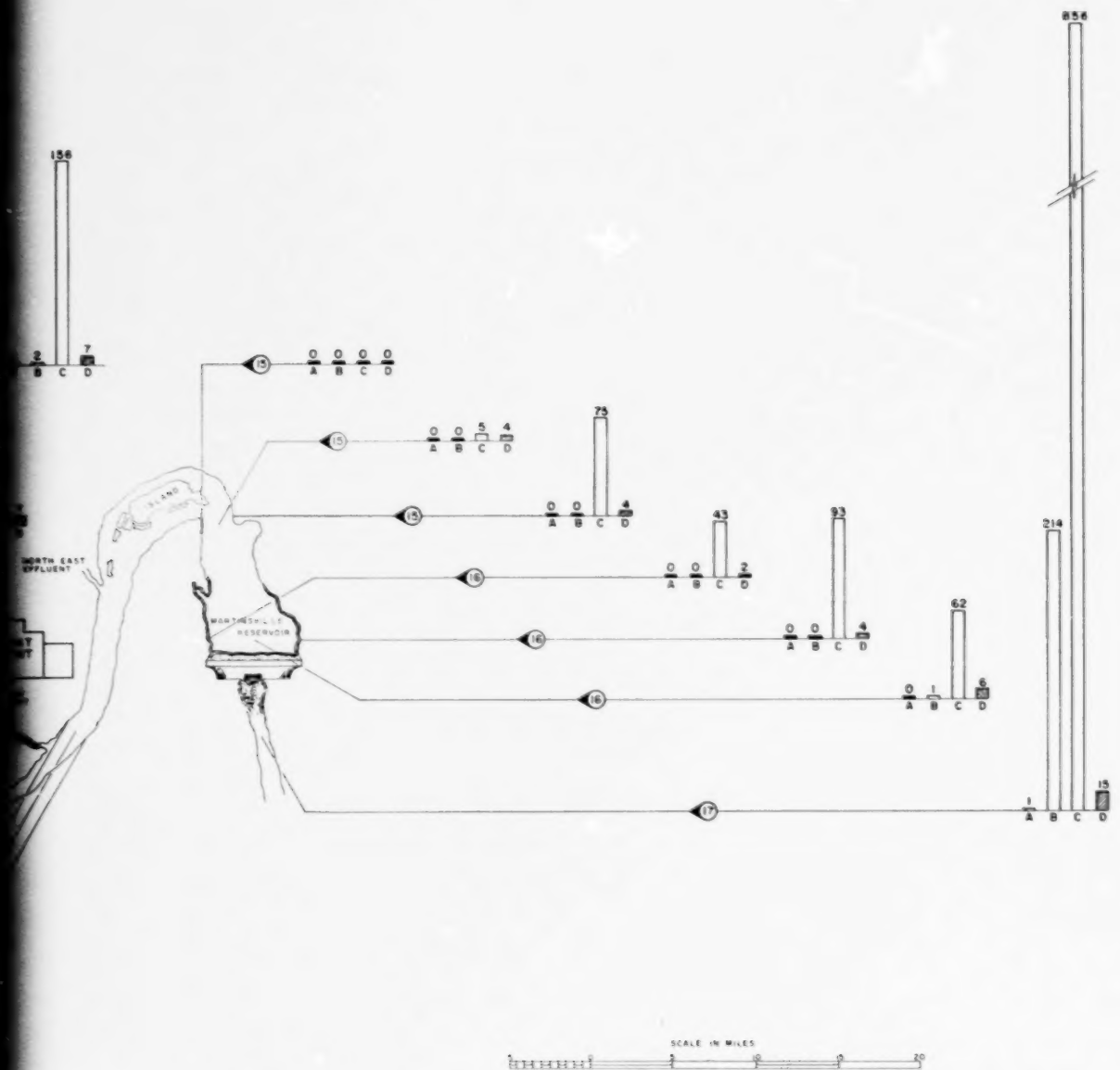
BOTTOM ORGANISMS:

A CLEAN WATER ORGANISMS FOUND SQ. FT. SAMPLE

B INTERMEDIATE ORGANISMS FOUND SQ. FT. SAMPLE

C POLLUTION TOLERANT ORGANISMS IN SQ. FT. SAMPLE

D TOTAL No. OF KINDS, INCLUDING A, B, & C



BOTTOM ORGANISMS:

- A CLEAN WATER ORGANISMS FOUND IN SQ. FT. SAMPLE
- B INTERMEDIATE ORGANISMS FOUND IN SQ. FT. SAMPLE
- C POLLUTION TOLERANT ORGANISMS FOUND IN SQ. FT. SAMPLE
- D TOTAL No. OF KINDS, INCLUDING TYPES A, B, & C

ROANOKE RIVER BASIN
MIDDLE ATLANTIC DRAINAGE AREA

BIOLOGICAL SURVEY

SMITH RIVER - Martinsville Vicinity

ENVIRONMENTAL PROTECTION AGENCY
REGION III PHILADELPHIA, PA.

FIGURE 1-A